EXHIBIT #17 (Exhibit for Draft Feasibility Report May2006)

PERSPECTIVES and DISCUSSION ON KANSAS CITYS LEVEES PERFORMANCE ANALYSIS

Principles of Flood Damage Reduction Planning and Associated Analysis

The Corps of Engineers functions and operates in accordance with laws established by Congress. The Corps develops policy and guidance for implementation of the laws under which it operates. The laws, and Corps policy and guidance, provide for the use of prescribed methodologies and nationwide uniformity in the Corps planning process. Corps planning products are reviewed locally, independently, and by three levels of Washington review, i.e., Corps Headquarters, Assistant Secretary of the Army for Civil Works, and Office of Management and Budget. Reviews not only ensure consistency and accuracy in the application of the prescribed methodologies, but determine and confirm that the work was completed with adherence to guidance, policy and the law.

The structured and uniform planning process implemented and followed by the Corps of Engineers is documented in Engineering Regulation 1105-2-100, Planning Guidance Notebook. This regulation is grounded in the laws which apply to the Civil Works Program and to the Corps of Engineers missions, and is particularly based on the <u>Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies</u> (P&G) (March 10, 1983). The P&G were established pursuant to Section 103 of the Water Resources Planning Act (Public Law 89-80) and Executive Order 11747.

Corps policy and guidance provide for proper and consistent planning in the formulation of reasonable plans responsive to National, State, and local concerns. The resulting plans recommended for implementation are economically and environmentally sound and in general reasonably maximize net national economic development benefits, consistent with protecting the Nation's environment (NED plan). Contributions to national economic development (NED) are increases in the net value of the national output of goods and services, and are the direct net benefits that accrue in the planning area and in the rest of the nation as a result of project implementation.

The Corps uniform planning process includes certain fundamental principles in the analysis of flood damage reduction alternatives. These principles include, among others:

- <u>With and Without-Project Analysis</u>. The without-project condition is the most likely condition expected to exist in the future in the absence of a proposed water resources project. The future without project condition constitutes the benchmark against which plans are evaluated.

- <u>Benefit-Cost Analysis and Cost Effectiveness Analysis</u>. This is a framework used in evaluating government investments. All pertinent costs and effects of a proposed project are systematically identified and tallied. The stream of monetized benefits that occur through time with project implementation are accumulated and are discounted to a base year in order to express a single total benefit figure. Similarly on the cost side the same accumulating and discounting process is conducted so the costs are also expressed as a single value in the base year. This process allows direct comparison of benefits and costs on a common basis. If the benefits exceed the costs the project is considered economically justified. Allowable benefits categories and required cost categories to be used in analysis of Corps water resource projects are standardized across the nation. Cost effectiveness analysis seeks to answer the question: given an adequately described objective, what is the least-costly way of attaining that objective.

- Net Benefits, Optimization Analysis. Benefits can be monetary or non-monetary. The scale of flood damage reduction alternative that reasonably maximizes expected net benefits (returns the greatest excess of benefits over costs) is the National Economic Development (NED) Plan.

- Risk and Uncertainty. Risk-based analysis is defined as an approach to evaluation and decision making that explicitly, and to the extent practical, analytically, incorporates considerations of risk and uncertainty in a flood damage reduction study. In water resources planning, risk-based analysis is used to compare plans in terms of the likelihood and variability of their physical performance, economic success and residual risks. It captures and quantifies the extent of risk and uncertainty in the various planning and design components of an investment project.

Risk Based Analysis of Flood Damage Reduction Alternatives

Flood damage reduction projects can significantly reduce risk of flooding, but 100% absolute protection from flooding is not an achievable goal. A zero residual risk does not exist because no project can completely eliminate natural hazards. Flooding may occur less frequently but there is always some residual risk of flooding after implementation of any flood damage reduction project.

Historically, many flood control projects were planned, designed, and constructed on the Standard Project Flood (SPF). The SPF was generated using modeling techniques to determine a single target design discharge. In later years, the SPF may have been associated with a return interval to describe an expected level of protection for a given flood control project. In the context of risk analysis guidance, the SPF is no longer used for a “target design”. Instead, a range of floods, including those that exceed the SPF, are to be used in formulation and evaluation of alternatives. The historic SPF method relied on safety factors and freeboard, estimates of worst case scenarios, and other indirect methods to compensate for uncertainty. These indirect methods were necessitated due to the mathematical complexities involved in computing the interaction of uncertainties in hydrologic, hydraulic, and economic functions. However, with computational advances it is now possible to describe these uncertainties explicitly and calculate that interaction.

For risk and uncertainty analysis, the Corps of Engineers uses risk-based analysis procedures for formulating and evaluating flood damage reduction measures according to guidance in Engineering Manual 1110-2-1619, Engineering and Design Risk Based Analysis for Flood Damage Reduction Studies; and in Engineering Regulation 1105-2-101, Planning Risk Analysis for Flood Damage Reduction Studies. Risk and uncertainty arise from measurement errors and from the underlying variability of complex natural, social, and economic situations. Flooding is random in nature and flood problems are multi-dimensional making it difficult to fully understand, document, and model the physical nature of flooding, its magnitude, its probability of occurrence, and its consequences. Risk is defined as the probability an area will be flooded, resulting in undesirable consequences. Uncertainty is a measure of imprecision of knowledge of parameters and functions used to describe the hydraulic, hydrologic, geotechnical, structural, and economic aspects of a project plan.

In water resource planning for flood damage reduction, uncertainties in the hydrologic and hydraulic data about discharges and flood stages, uncertainties in economic data about investment values, beginning damage elevations, and damages with various flood depths, and uncertainties about the potential for geotechnical or structural failure of features in an existing flood control project can have significant impact on the residual damages, benefits, costs, planning, design, and reliabilities of a proposed flood control project.

To develop a risk based analysis as required by regulation, the Corps uses the HEC (Hydrologic Engineering Center) Flood Damage reduction Analysis (HECFDA) model. The HECFDA model combines the engineering and economic study data to determine economic performance (flood damages) and engineering performance (probability of design exceedance) with and without a flood control project. The HECFDA model uses the Monte Carlo simulation process which incorporates the risk and uncertainties associated with the required HECFDA input values.

Planners cannot know with full certainty the exact value of a variable that may ultimately be important to the selection and implementation of a plan. The analysis instead considers a best estimate of the value, and recognizes the uncertainty inherent in that value by also using other possible values (often in terms of input curve). The range of outcomes in some areas of risk and uncertainty can be reasonably described or characterized by a probability distribution. Certain future demographic, economic, hydrologic, and meteorological events are essentially unpredictable because they are subject to random influences; however the randomness can sometimes be described by a probability distribution based on historical data. If there is no historical database, the probability distribution of random future events can be described subjectively, based on insight and judgment.

Key variables explicitly incorporated into the risk based analyses used in the Kansas Citys feasibility study included the following:

- <u>Hydraulic uncertainty</u>. A stage-exceedance probability function was developed from the water surface profiles and a normal probability distribution was selected. Conveyance roughness and cross-section geometry were evaluated to determine a standard deviation of 1.5 feet in the base year and 1.8 feet in future years for uncertainty in river elevation, given a certain discharge.

- <u>Hydrologic uncertainty</u>. A graphical discharge-frequency exceedance probability function was developed in the HEC-FDA model for each reach based on a 70 year period of record. The distribution of errors is assumed to be a non-central t-distribution about the specified function.

- <u>Investment value uncertainty</u>. Interview data about most likely structure and content values, and the minimum and maximum range of values for each were obtained from business owners and representatives and entered into HEC-FDA. For structures that did not have specific data obtained by surveys and interviews, expected values for structures and contents were estimated using Marshall & Swift professional valuation software or from locally obtained study area data for similar businesses. The uncertainty was defined using a normal or triangular probability distribution, depending on the type of structure and category of damage, and any other specific data available.

- Structure and beginning damage elevation uncertainty. Uncertainties about ground and first floor elevations (beginning damage elevations) were determined based on two and four foot contours on study area mapping. Uncertainties were determined per guidance in Engineering Manual 1110-2-1619, Risk Based Analysis for Flood Damage Reduction Studies.

- Depth-damage relationship uncertainty. Structure occupancy types were defined for each type of structure and category of damage. The structure occupancy code defines the depth-percent damage function and its uncertainties. Normal and triangular probability distributions were used based on the category of damage, type of structure, and type of use.

- Uncertainty about geotechnical or structural failure. Probabilities of geotechnical and structural failure in each unit were developed using engineering analysis. Geotechnical and structural engineers determined the most likely expected modes and sites of failure prior to overtopping in each unit. A range of conditional probabilities of failure versus river stage elevation encompassing the probable failure point and non failure point were determined for each site/mode of failure. The river elevation versus probability of failure relationship developed by the geotechnical and structural engineers for each potential failure site/mode was then translated to the index point of the reach (levee unit) and each individual potential failure site/mode was determined to be independent. The probabilities of failure for each site/mode were then combined using a formula contained in ETL 1110-2-556 to derive a single combined probability of failure versus river stage curve that accounted for all the sites or modes of potential failure. The resulting combined probability of failure curve was then entered into the HECFDA study file.

Future With-and Without-Project Condition Economic Performance

Economic Performance of Overall Plan. Implementation of the recommended plan (NED plan) in each of the units addressed in the interim feasibility report will provide significant reduction in physical flood damages and other costs that result from flooding. The damages reduced represent the benefits provided by the recommended plan and are typically characterized in terms of annualized equivalent values as computed in the HECFDA program.

The table on the following page summarizes the equivalent annual damages that would be expected to occur with and without the recommended plan. The uncertainties in evaluation of project benefits are characterized in the far right three columns of the table. For example, for the Argentine Unit recommended plan would provide expected benefits (flood damages and other costs of flooding reduced by the plan) in excess of $18 million annually. Based on risk and uncertainty analyses, there is a 75% probability that these benefits are nearly $8 million annually, a 50% probability that benefits provided would be more than $14 million annually, and a 25% probability that project benefits would be more than $24.6 million annually.

Equivalent Annual Damages and Damages Reduced (Oct 2005 Prices, 5.125% Inter Rate, 50 Yr Period of Anal, $000

Plan	**Top of Levee/ Floodwall Elev (ft)**	**Expected Value and Probabilistic Values of EAD and EAD Reduced**					
		Equivalent Annual Damage			**Probability EAD Reduced Exceeds Indicated Amount**		
		Without Plan	**With Plan**	**Damage Reduced**	**.75**	**.50**	**.25**
ARGENTINE UNIT							
Future **WITHOUT** Project	776.00	$22,325.5	-	-	-	-	-
Future **WITH** Project: Alt 2 Nom 500+3 (NED Plan)	781.24		$4,160.1	$18,165.4	$7,852.47	$14,660.65	$24,639.82
FAIRFAX-JERSEY CREEK UNIT							
Future **WITHOUT** Project	760.5	$16,563.2	-	-	-	-	-
Future **WITH** Project: Total Fairfax-Jersey Cr Unit NED Plan (BPU Floodwall and JC Sheetpile Wall Solutions)	760.5		$4,549.0	$12,014.3	$4,241.49	$8,634.72	$16,529.34
NORTH KANSAS CITY UNIT							
Future **WITHOUT** Project	755.5	$11,780.8	-	-	-	-	-
Future **WITH** Project: Total North Kansas City Unit NED Plan (Harlem and National Starch Sites Solutions)	755.5		$4,914.9	$6,865.9	$2,858.87	$5,154.55	$8,777.06
EAST BOTTOMS UNIT							
Future **WITHOUT** Project	746.3	$7,344.3	-	-	-	-	-
Future **WITH** Project: East Bottoms Unit NED Plan (Confluence Site Solution)	746.3		$2,986.2	$4,358.0	$2,014.10	$2,968.23	$5,138.54

Future With- and Without-Project Condition Engineering Performance

Conditional Probability of Design Non-Exceedance. One of the many metrics that can be used to characterize the performance of a flood protection project is overall project reliability against the 1% event. Project reliability is characterized in the HECFDA model by the probability of the project design containing a specified event or the probability of design non-exceedance. Overall reliability against the 1% event and other engineering performance data include consideration of both the probability of overtopping and also the probability of geotechnical and structural failure.

The table below displays for each unit addressed in the Interim Feasibility Report the with- and without- project condition overall project reliability against the 1% probability event, and shows the top of levee margins above the 1% and 0.2% event water surface profile.

FUTURE CONDITION OVERTOPPING MARGINS AND OVERALL RELIABILITY AGAINST THE 1% CHANCE EVENT WITH AND WITHOUT PROJECT

	Top of Levee/ Floodwall Elev. at Index Point (ft, msl)	Overtopping Margin (ft) Above 1.0% Chance Event Profile	Overtopping Margin (ft) Above the 0.2% Chance Event Profile	Overall Reliability Against the 1% Chance Event (includes geotechnical and structural risk considerations)
ARGENTINE, Kansas R.M. 9.6				
Future **WITHOUT** Project	776.0	6.39	-2.24	0.49
Future **WITH** Project	781.24	11.63	3.0	0.99
Net Change in Margins and Overall Reliability	+5.24	+5.24	+5.24	+0.50
Argentine Recommended Plan: Nominal 500+3 Raise, including embankment, floodwall and pump station improvements. Argentine With Project Residual Risk: Overtopping potential; very minor geotechnical/structural residual risk near top of levee.				
FAIRFAX-JERSEY CREEK, Missouri R.M. 367.7				
Future **WITHOUT** Project	760.5*	8.97*	2.89*	0.82*
Future **WITH** Project	760.5*	8.97*	2.89*	0.99*
Net Change in Margins and Overall Reliability	No chg	No chg	No chg	+0.17
Fairfax-Jersey Creek Recommended Plan: BPU Floodwall Solution and Jersey Cr Sheetpile Wall solution. Fairfax-Jersey Creek With Project Residual Risk: Two flood fight locations, one near the Lower Tieback and one near the Jersey Cr Outlet; overtopping potential; very minor geotechnical/structural residual risk near top of levee. Low Point Initial Overtopping Location: Mouth of Kansas River Margin (ft) above 0.2% Water Surface at Low Point Location: 2.89				
NORTH KANSAS CITY, Missouri R.M. 365.8				
Future **WITHOUT** Project	755.5	6.69	1.05	0.85
Future **WITH** Project	755.5	6.69	1.05	0.98
Net Change in Margins and Overall Reliability	No chg	No chg	No chg	+0.13
North Kansas City Recommended Plan: Harlem Site Underseepage solution and National Starch Site Underseepage Solution. North Kansas City With Project Residual Risk: overtopping potential; very minor residual geotechnical risk near top of levee. Low Point Initial Overtopping Location: R.M. 369.1, North End of Downtown Airport Runway Margin (ft) above 0.2% Water Surface at Low Point Location: 1.05				
EAST BOTTOMS, Missouri R.M. 357.6				
Future **WITHOUT** Project	746.3	8.04	3.67	0.96
Future **WITH** Project	746.3	8.04	3.67	0.998
Net Change in Margins and Overall Reliability	No chg	No chg	No chg	+0.04 (additional reliability gains against lower probability events)
East Bottoms Recommended Plan: Underseepage Solution near the confluence of the Blue River. East Bottoms With Project Residual Risk: Minor structural risk at Floodwall Sta 64+48 to 74+56; very minor residual geotechnical risk near top of levee; overtopping potential. Low Point Initial Overtopping Location: R.M. 365.8 Margin (ft above 0.2% Water Surface at Low Point Location: 3.67				
BIRMINGHAM, Missouri R.M. 355.9				
Future **WITHOUT** Project	743.0	6.28	1.82	0.98
Future **WITH** Project	743.0	6.28	1.82	0.98
Net Change in Margins and Overall Reliability	No chg	No chg	No chg	No chg
Low Point Initial Overtopping Location: Shoal Creek Tieback Margin (ft) above 0.2% Water Surface at Low Point Location: 1.82				

*Overtopping margins and reliability data shown for Fairfax-Jersey Cr Unit assume a successful flood fight at lower tieback and Jersey Cr outlet
**Any discrepancies due to rounding

Levee Performance in Any Given Year and Equivalent Long-term Risk. Long-term risk indicates how successfully a flood control project would protect against floods given the uncertainties and over a long period of time. Annual Exceedance Probability is the probability that flooding will occur in any given year considering the full range of possible annual floods. (*Note:* The terms "exceeded" or "exceedance" when used herein with regard to engineering performance data include consideration of both geotechnical and structural failure potential and consideration of the potential for levee overtopping.)

For each of the units addressed by the Interim Feasibility Report, the table below shows the long-term risk or probability of the project being exceeded in a 10-, 25-, and 50-year period, with and without the recommended plan for each unit. The table below also shows the expected probability of the levee design being exceeded (occurrence of flooding) in any given year. For example, the Argentine Unit existing levee has a 0.013 probability of flooding in any year, given the range of possible flood events. With implementation of the recommended plan, the probability that the Argentine Unit will be flooded in any given year decreases to a 0.002 probability. Over a 50-year period, there is a 0.487 probability that the Argentine existing levee will be overtopped and/or suffer geotechnical/structural failure compared with a .093 probability with implementation of the recommended plan. The recommended plan provides a 0.394 decrease in probability of exceedance over a 50-year period. Significant decreases in probability of exceedance over 25 years and 10 years are also realized with implementation of the recommended plan.

ENGINEERING PERFORMANCE IN ANY GIVEN YEAR AND EQUIVALENT LONG-TERM RISK WITHOUT- PROJECT AND WITH-PROJECT RECOMMENDED PLAN					
	Top of Levee/ Floodwall Elevation (ft msl) at Index Pt.	Annual Exceedance Probability (Expected Probability that Flooding Will Occur in any Given Year)	Equivalent Long-Term Risk (Probability of Exceedance Over the Indicated Time Period) (includes geotechnical and structural risk considerations)		
			10 Years	25 Years	50 Years
ARGENTINE, Kansas R.M. 9.6					
Future **WITHOUT** Project	776.0	.013	.125	.284	.487
Future **WITH** Project	781.24	.002	.019	.048	.093
Net Change in Probability of Exceedance (Flooding)	+5.24 ft	-.011	-.106	-.236	-.394
FAIRFAX-JERSEY CREEK, Missouri R.M. 367.7					
Future **WITHOUT** Project	760.5	.007	.064	.152	.281
Future **WITH** Project	760.5	.001	.013	.032	.062
Net Change in Probability of Exceedance (Flooding)	No chg	-.006	-.051	-.120	-.219
NORTH KANSAS CTIY, Missouri R.M. 365.8					
Future **WITHOUT** Project	755.5	.005	.053	.128	.240
Future **WITH** Project	755.5	.001	.011	.027	.054
Net Change in Probability of Exceedance (Flooding)	No chg	-.004	-.042	-.101	-.186
EAST BOTTOMS, Missouri R.M. 357.6					
Future **WITHOUT** Project	746.3	.002	.024	.059	.115
Future **WITH** Project	746.3	.000	.003	.008	.017
Net Change in Probability of Exceedance (Flooding)	No chg	-.002	-.021	-.051	-.098
BIRMINGHAM, Missouri R.M. 355.9					
Future **WITHOUT** Project	743.0	.002	.015	.037	.072
Future **WITH** Project	No chg	No chg	No chg	No chg	No chg
Net Change in Probability of Exceedance (Flooding)	No chg	No chg	No chg	No chg	No chg

Note: Any discrepancies due to rounding

As shown in the table on the following page, long term risk can be alternatively described in terms of chance of flooding in any one year or in a specified time period. For example, the equivalent long-term residual risk with the recommended Argentine Unit plan in place can be characterized as follows: There is a 1 in 76.9 chance that the Argentine Unit will flood in any year under the future without project condition. With the recommended plan, the Argentine Unit has a 1 in 500 chance of flooding in any year. Over a fifty year period there is a 1 in 10.8 chance that the capacity of the project to protect against flooding will be exceeded one or more times.

This demonstrates a significant improvement over the without project condition risk of 1 in 2.1 chance over 50 years. Over 25 years, there is a 1 in 20.8 chance of the project design capacity being exceeded, again a significant improvement over the 1 in 3.5 chance with the existing project. Over 10 years there is a 1 in 52.6 chance with the recommended plan compared with a 1 in 8.0 chance with the existing project.

ALTERNATIVE DISPLAY OF ENGINEERING PERFORMANCE IN ANY GIVEN YEAR AND EQUIVALENT LONG TERM RISK WITHOUT PROJECT AND WITH-PROJECT RECOMMENDED PLAN					
	Top of Levee/ Floodwall Elevation at Index Point (ft msl)	**Chance of Exceedance (Flooding) in any Given Year**	**Equivalent Long-Term Risk (Chance of Exceedance Over the Indicated Time Period) (includes geotechnical and structural risk considerations)**		
			10 Years	25 Years	50 Years
ARGENTINE, Kansas R.M. 9.6					
Future **WITHOUT** Project	776.00	1 in 76.9	1 in 8.0	1 in 3.5	1 in 2.1
Future **WITH** Project	781.24	1 in 500	1 in 52.6	1 in 20.8	1 in 10.8
FAIRFAX-JERSEY CREEK, Missouri R.M. 367.7					
Future **WITHOUT** Project	760.50	1 in 142.9	1 in 15.6	1 in 6.6	1 in 3.6
Future **WITH** Project	760.50	1 in 1000	1 in 76.9	1 in 31.2	1 in 16.1
NORTH KANSAS CITY, Missouri R.M. 365.8					
Future **WITHOUT** Project	755.50	1 in 200	1 in 18.9	1 in 7.8	1 in 4.2
Future **WITH** Project	755.50	1 in 1000	1 in 90.9	1 in 37.0	1 in 18.5
EAST BOTTOMS, Missouri R.M. 357.6					
Future **WITHOUT** Project	746.30	1 in 500	1 in 41.7	1 in 16.9	1 in 8.7
Future **WITH** Project	746.30	1 in 3000	1 in 333.3	1 in 125.0	1 in 58.8
BIRMINGHAM, Missouri R.M. 355.9					
Future **WITHOUT** Project	743.00	1 in 500	1 in 66.7	1 in 27.0	1 in 13.9
Future **WITH** Project	743.00	No chg	No chg	No chg	No chg

Note: Any discrepancies due to rounding

Residual Risk.
In an environment where competition for public funds is keen, most communities cannot be made 100% safe from the threat of flooding. It is important that floodplain occupants are aware of the nature of the flood threats and are able to make informed decisions about acceptable levels of risk. Often however, the concepts of risk and probabilistic characterizations are difficult to understand.

The tables presented in this paper show that the recommended plan for the units addressed by this interim feasibility report provides a significant increase in reliability against flooding. Flooding will be less frequent; however, the analyses show there is still residual risk of flooding. For the Corps, determining an acceptable level of risk is in most cases a function of the NED process. The goal is to manage the risk of flooding within limited budget and funding constraints, and yet implement a cost effective and efficient flood damage reduction plan that reasonably maximizes net economic benefits (flood damage reduction benefits) consistent with protecting the Nation's environment (NED plan).

From the Federal perspective, selection of the NED plan as the recommended alternative is a determination of an acceptable level of residual risk based on trade-offs between potential benefits and the associated level of residual risk versus the cost of a larger and more risk-adverse flood damage reduction project. Increases in project reliability above what is provided by the NED plan can sometimes be achieved with much larger projects. However, in most instances, costs for larger projects increase dramatically faster than project benefits. The NED plan maximizes net benefits as measured by the difference between annual benefits and annual costs..

From the local perspective, a community or sponsor may desire less residual risk of flooding than that provided by the NED plan. Many persons in a community might express the desire for zero residual risk and no chance of damage from a recurrence of flooding, even though this is an economically unattainable goal. The level of risk a community (or sponsor) is willing to bear can be indicated by their willingness to pay for each additional increment of flood risk reduction. In accordance with Federal law, if a larger (more costly) “Locally Preferred Plan” than the NED plan is selected (a plan that may have higher benefits, higher costs and fewer net benefits than the NED plan), the project sponsor is required to “buy-up” or pay the difference in cost between the NED plan and the Locally Preferred Plan.

Other Considerations Related to Risk and Reliability

It is important to bear in mind the variability and uncertainty associated with the inputs to a risk and uncertainty analysis.

- Care must be taken to consider the entire output of the analysis rather than placing undue reliance on any one statistic.
- Such simulations are sensitive to assumptions about correlations between parameters, the likelihood that a particular specification is correct, any omitted factors, and assumptions about the appropriate distribution for parameters, etc.
- Generally, the quality of the overall analysis is reflective of the quality (or accuracy) of its input components.

This interim feasibility study is, in many respects, a groundbreaking effort with regard to the scale and scope of effort. In the past, many Corps studies have been performed using risk and uncertainty principles for planning smaller levee systems limited to flood events at or about the 1% event. The target conveyance in the original authorizations places this system in the upper echelon of U.S. levee systems. This makes it difficult for direct comparisons to other levee systems of the results and reliabilities produced by this analysis. The possibility for better characterization and comparison for residual risk is expected as the number of larger levee systems analyzed using risk and uncertainty principles increases over time.

In general, water resource development and planning continues to be a field where judgment and context plays a vital role. There can never be one exact solution to all conceivable issues. The feasibility process undertaken in this study allows for a reasoned and systematic approach to formulating plans. However, natural environments and especially the dynamic characteristics inherent in river systems, remain subject to re-interpretation and refinements as the knowledge base and experience with those systems grow over time.

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